



Straightbreeding – A simple way to reduce your bottomline

D. A. Daley
California State University, Chico

NCBCEC Brown Bagger Session
October 17, 2012



Genetic Improvement

- Selection - within breed (use of genetic predictors (EPD's and indices, genomics)
- Crossbreeding - heterosis / breed complementarity



Breed Complementarity

The degree to which two breeds complement one another.....

MORE EFFICIENT MEANS MORE HEREFORD.

HEREFORD — MAKING BLACK BETTER.

For efficiency and profitability, nothing gets you there faster than Hereford. Hereford characteristics, such as gain and feed conversion, show a \$78 advantage per head over Angus-sired calves from start to finish. Ideal for your herd and for the future of your business, adding Hereford gives you the power to become more profitable.





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- ❶ **Heterosis** - the superiority of the crossbred progeny compared to the average of the parental breeds.....
 - ❷ **Maternal Heterosis** - the increase in calf performance due to the maternal effect of a crossbred cow



Heterosis – what should we expect?

- ❁ Primary advantage in the “lowly heritable” traits --- “the non-additive genetic portion”
- ❁ Small, net positive effects in many traits
- ❁ Fitness traits---often difficult to measure and difficult to “visualize” success
- ❁ **LARGE NET POSITIVE CUMULATIVE EFFECT.**



Direct (individual) vs. maternal heterosis

----Heterosis of the calf = 8.5%
(individual)

----Heterosis of the F1 = 14.5%
(maternal)



Heterosis Effects – individual (crossbred calves)

- Calving rate 4.4%
- Survival to weaning 1.9%
- Weaning weight 3.9%
- Postweaning ADG 2.6%
- Yearling weight 3.8%
- Feed conversion 2.2%.



Heterosis effects – maternal Crossbred cows

- Calving rate 3.7%
- Survival to weaning 1.5%
- Weaning weight 3.9%
- LONGEVITY 38%
- NUMBER OF CALVES 17.0%
- CUMULATIVE WEANING WT. 25.3%.

Lifetime Membership in “The Breed of the Month Club”





The Perception of Crossbreeding

- ④ increase variability
- ④ lack of consistency
- ④ “mongerelize” the nation’s cow herd
- ④ “too many breeds”
- ④ lack of predictability.



The lack of implementation of well planned crossbreeding systems is the result of.....

- ❶ Early failures because of the wrong genetic inputs.....
- ❷ Purebred breeders.....
- ❸ Culture.....
- ❹ We measure the wrong traits!



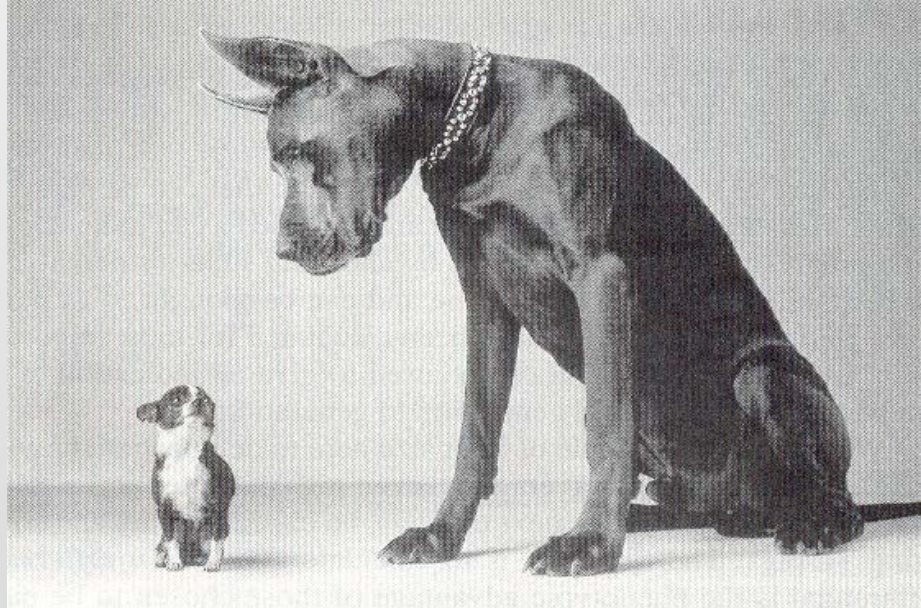
Planned Crossbreeding Programs

- Systematic – utilize resource base
- Retain HETEROSIS
- Breed complementarity
- SIMPLE
- Marketability
- MATCH COWS TO THEIR ENVIRONMENT
- MEASURE PROFIT.



Why not planned crossbreeding?

1. A cultural bias that clearly reflects “purebreds are better!”

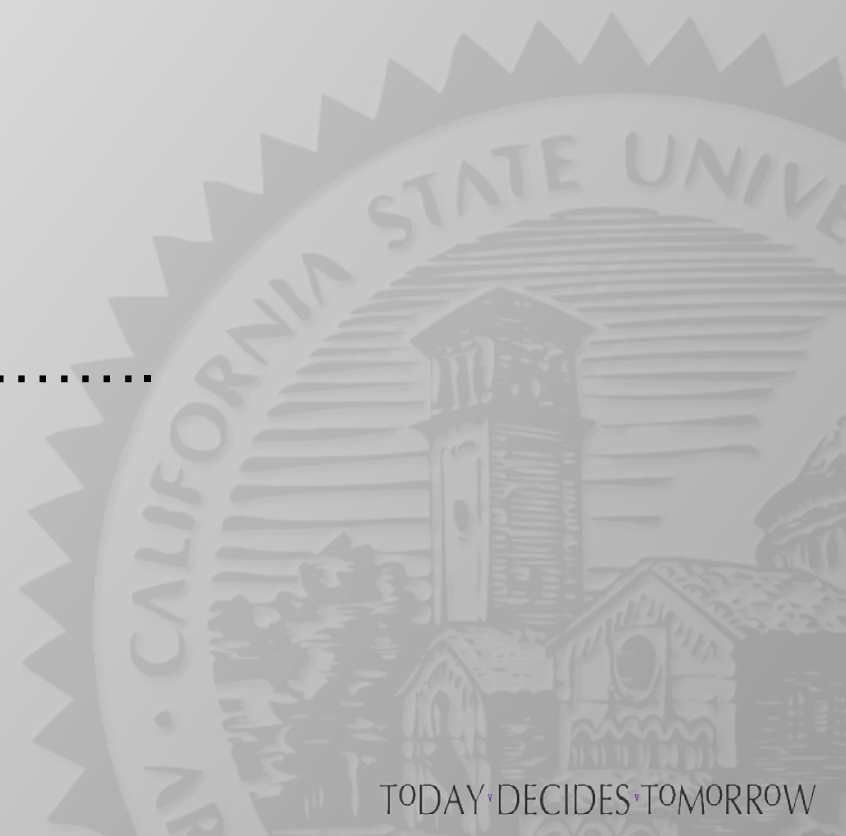




Why not crossbreeding?

3. We have decided that measuring outputs is more meaningful than measuring inputs---and easier!

- Average daily gain
- Ribeye area
- Quality grade
- Weaning weight
- Milk
-and the list goes on.....

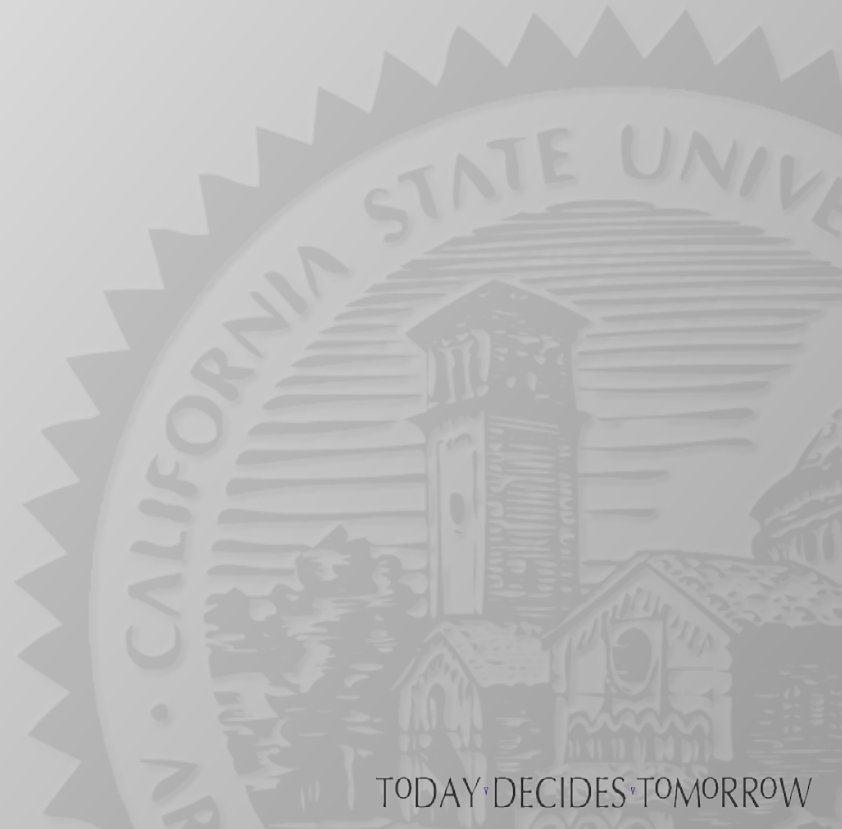




Why not crossbreeding?

5. Heterosis is very difficult to visualize and even more difficult to measure.

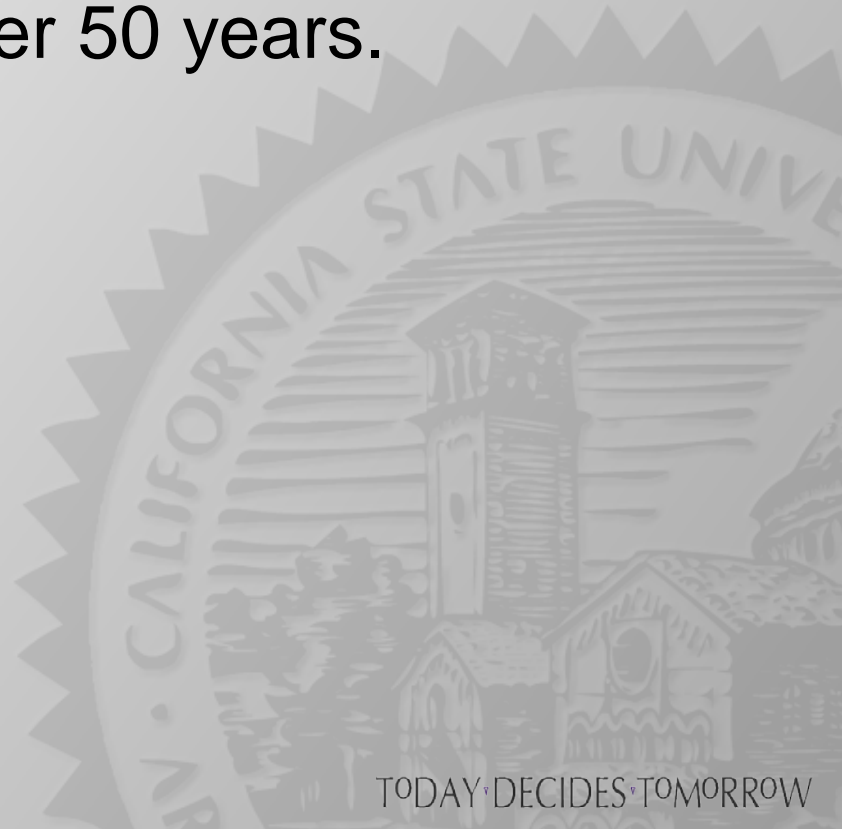
- 🌱 longevity
- 🌱 morbidity
- 🌱 livability
- 🌱 age at puberty
- 🌱 lifetime productivity





Why not crossbreeding?

- ❖ 10. Our industry and academics have focused on individual animal measurements for over 50 years.





The impact of crossbreeding on vertically coordinated beef systems





Objective

- ❶ Conduct a controlled crossbreeding field trial under “real world conditions”, comparing Angus and Hereford bulls on an Angus based cow herd
- ❷ Measure traits that may have potential to impact overall profitability





Materials & Methods

- ❶ 600 Angus based cows randomly mated to 15 Angus or 15 Hereford bulls
- ❷ Project conducted for 3 years
- ❸ Records maintained on all calves born into the project through production cycle
- ❹ Sire verification through calf DNA samples





Hypothesis

- ❶ Slight advantage in direct heterosis (weaning, feedlot, carcass)
- ❷ Large return for maternal heterosis (small incremental advantage in fitness traits, longevity, # of calves weaned per cow exposed)







Results

Weaning – slight advantage in “pre-conditioning”, 12 pounds + for crossbred calves.





Results – primary differences

<u>Trait</u>	<u>Angus x</u>	<u>Hereford X</u>
# of hd	297	284
<i>ADG</i>	3.45	3.48
FE – as fed	7.44	7.05
FE – DM	5.52	5.25
Cost of gain	79.77	75.98
Hospital cost/hd	14.52	12.68
Carcass - strs.	+15 % Choice	
cullt hfrs.	+5% Choice	



Summary of Results-Direct heterosis

- Slight increase in weaning performance
- Increase in average daily gain
- Increase in feed efficiency
- Decrease in cost of gain
- Decrease in quality grade
- **Increase in net return - + \$20 per head**



Crossbreeding (maternal heterosis)

- ❁ 7 percent increase in pregnancy rates of “F1” yearling heifers compared to “straightbred.....”
- ❁ Similar to “Circle A” data
- ❁ Modeled to be about \$50 per cow advantage





The application.....

- ❖ There is still an advantage to a black hide (read Angus)...depending on your market
- ❖ Creating replacement females that have maternal heterosis—yet are still black and bred back to Angus bulls.



We have focused on sexy traits – not profit traits.....

- ❁ Our industry has focused on maximums, rather than on maximum return.
- ❁ When are we going to focus on maximum sustained profit per acre, per hectare or per unit—not maximum dollars per head.



The basic premise of seedstock production.....

- ❁ All breeds can do all things! Just ask the breeders.....
- ❁ We have not capitalized on maternal and paternal lines...we have spent far too much time trying to blur those lines rather than utilize the differences.



Cattle breeding

- ❖ Rather than making the complex simple (the mark of a great teacher), we seem bent on making the simple complex.....
 - ❖ *Selection within breeds using EPD's*
 - ❖ *Planned crossbreeding to capitalize on heterosis.....*



Cattle breeding – so what have we done...

- ⦿ Increased growth rate and mature size
- ⦿ Focused on carcass merit (improved)
- ⦿ Increased milk
- ⦿ Increased maintenance cost
- ⦿ Decreased functionality/adaptability
- ⦿ Decreased longevity
- ⦿ Made cattle phenotypically “better”
- ⦿ Developed “trait leader” lists emphasizing maximums
- ⦿ Selected for fertility with a feed truck
- ⦿ Decreased emphasis on the ability of the cow to harvest low quality forages



Cattle Breeding – progress report

- ❖ We have lots of measurement of “horsepower” ...
 - ❖ *What about miles per gallon?*
 - ❖ *Warranty on the engine or powertrain?*
 - ❖ *Years of service?*
 - ❖ *Is it “buyer beware”?*



TODAY DECIDES TOMORROW